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DARBY & DARBY P.C.
805 Third Avenue
New York, NY 10022

EXAMINER

BEISNER, WILLIAM H

ART UNIT	PAPER NUMBER
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1744

DATE MAILED: 02/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/085,461

Applicant(s)

SHEN ET AL.

Examiner

William H. Beisner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Taiwan on 02 July 2001. It is noted, however, that applicant has not filed a certified copy of the Taiwan application as required by 35 U.S.C. 119(b).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 3-7, 13, 15, 16 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 3, "the equipment" lacks antecedent basis. It is suggested that "equipment" be changed to --apparatus--.

In claim 5, "the processing equipment filled with filler" lacks clear antecedent basis. Note the claim further defines this equipment to include "packed columns" and "sieve plate columns", however, claim 2 merely recites "a packed column". The language of claim 5 implies that broader claim language was employed in claim 2. Clarification and/or correction is requested.

Claim 7 is indefinite because some of the claim language lacks antecedent basis depending on which of the two claims it depends. It is suggested that the claim be changed to recite --wherein the ozone process apparatus further comprises a catalytic substance that accelerates the decomposition of ozone--.

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In claim 13, "the bio-filter bed" lacks antecedent basis.

In claims 15 and 16, "the ozonic process equipment" and "biological process equipment" lack antecedent basis. Note claim 1 is silent as to the use or presence of any equipment or apparatus.

In claim 19, "the noxious component" lacks antecedent basis. Note claim 1 is silent as to the presence of a noxious component.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

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the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1, 2, 12, 13 and 17-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smalheiser (US 3,933,980) in view of Bentz (US 5,064,763).

With respect to claim 1, the reference of Smalheiser discloses a method of processing alkene-containing exhaust gas that includes an ozonation process, wherein the alkene-containing exhaust gas reacts with ozone and the double bond is completely oxidized and broken down into small molecules (See column 3, lines 4-14).

The above claim differs by reciting that the treatment process includes an additional step of biologically degrading the small molecules resulting from the ozonation process.

The reference of Smalheiser discloses that it is known to further process the gas stream after ozonation of the gas stream by contacting the gas stream with an aqueous medium to remove products (small molecules) of the reaction (See column 3, lines 23-33). The reference also discloses that partially oxygenated hydrocarbons such as methanol remain in the gas stream after contact with the ozone (See column 3, lines 12-14).

The reference of Bentz discloses that it is well known in the art to employ a biofilter to process a gas stream that includes a number of hazardous organic compounds including methanol (See column 1, lines 45-59).

In view of these disclosures, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ a biological processing step as disclosed by the

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reference of Bentz after the ozone processing step of Smalheiser for the known and expected result of providing a means recognized in the art for removing any byproducts of the ozone treatment process and/or any residual hazardous material that is not reactive with the ozone. The additional treatment step would provide an additional means recognized in the art for treating the gas stream prior to exhausting the gas stream to the atmosphere.

With respect to claim 2, the reference of Smalheiser discloses performing the ozone contact step in a pipe or reaction vessel for admixing the gas stream with ozone for a sufficient time to react with the alkene-containing exhaust gas (See column 3, lines 4-9).

With respect to claims 12 and 13, the reference of Bentz discloses that the biological contacting is performed in a biofilter of packed support material (See Example 1). Whether the gas stream is passed through the bed in an upflow or downflow manner would have been merely an obvious matter in design choice while providing the required contacting of the gas stream with the support material.

With respect to claims 17 and 18, while the preferred alkene of Smalheiser is ethylenically unsaturated chlorinated hydrocarbons (EUCH), the reference discloses that the process is suitable for treating additional alkenes (See column 3, lines 63-69). In the absence of a showing of unexpected results, it would have been obvious to one of ordinary skill in the art to process a gas stream containing any combination of alkene compounds while providing the benefits associated with the use of the process disclosed by the reference of Smalheiser.

With respect to claim 19, the reference of Bentz discloses that the biological treatment step is capable of treating noxious components of a gas stream, such as thiols and hydrogen sulfide (See column 1, lines 45-61).

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With respect to claims 20 and 21, the reference of Smalheiser discloses that it is well within the skill of one in the art to determine optimum amounts of ozone to be mixed with the gas stream at a given temperature to obtain the reduction in the amount of alkene required (See column 4, lines 36-53).

With respect to claims 22-24, in the absence of a showing of criticality and/or unexpected results, the use of monitors and/or controllers so as to optimize the reactions conditions would have been well within the skill of one in the art for the known and expected result of providing a means recognized in the art for responding to changes in the components of the exhaust gas stream while optimizing the contacting conditions and/or conserving the amount of reagents employed.

8. Claims 5-8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smalheiser (US 3,933,980) in view of Bentz (US 5,064,763) and Hondo et al.(JP 2000246050).

The combination of the reference of Smalheiser and Bentz has been discussed above.

With respect to claim 5, while the modified primary reference discloses an ozone-contacting step, the reference is silent as to the use of a packed column.

The reference of Hondo et al. discloses that it is known in the art to contact a gas stream with ozone in a packed bed of catalyst material (See the English language abstract and the Figure).

In view of this teaching, it would have been obvious to one of ordinary skill in the art to employ a gas contact device as disclosed by the reference of Hondo et al. for the known and expected result of providing an art recognized means for contacting a gas stream with ozone

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while providing a means for preventing the release of ozone to the environment or downstream processors of the treatment process.

With respect to claim 6, it would have been obvious to one of ordinary skill in the art to construct the apparatus of ozone resistant material for the known and expected result of preventing the destruction of the processing apparatus by the reagents and reaction within the apparatus.

With respect to claim 7, the reference disclose the use of catalyst (22).

With respect to claim 8, it would have been obvious to one of ordinary skill in the art to prevent ozone from contacting the biological treatment zone since ozone is known to kill microorganisms.

With respect to claim 16, the reference discloses that a biological treatment and ozone treatment are performed in separate reaction devices (See the Figure). As a result, it would have been obvious to one of ordinary skill in the art to employ two separate treatment devices for the known and expected result of allowing one device to be replaced without also replacing the other if problems occur in the system or components need to be replaced and/or repaired.

9. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smalheiser (US 3,933,980) in view of Bentz (US 5,064,763) and Tatsu (JP 2000139339).

The combination of the reference of Smalheiser and Bentz has been discussed above.

With respect to claim 3, while the modified primary reference discloses an ozone-contacting step, the reference is silent as to the use of a static blender.

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The reference of Tatsu discloses that the use of a static blender is known in the art for contacting a gas stream with an ozone gas (See the English language abstract and Figures).

In view of this teaching, it would have been obvious to one of ordinary skill in the art to employ a gas contact device as disclosed by the reference of Tatsu et al. for the known and expected result of providing an art recognized means for contacting a gas stream with ozone while providing a means for preventing the release of ozone to the environment or downstream processors of the treatment process.

With respect to claim 4, it would have been obvious to one of ordinary skill in the art to construct the apparatus of ozone resistant material for the known and expected result of preventing the destruction of the processing apparatus by the reagents and reaction within the apparatus.

10. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smalheiser (US 3,933,980) in view of Bentz (US 5,064,763), Hondo et al. (JP 2000246050) and Sudduth et al. (US 3,983,216).

The combination of the reference of Smalheiser, Bentz and Hondo et al. has been discussed above.

With respect to claims 9-11, the claims further require that the process includes contacting the gas with a filter material that can include activated carbon.

The reference of Sudduth et al. discloses that it is known in the art to employ activated carbon in the ozonation of the a gas stream so as to improve the ozonation process (See the entire disclosure).

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In view of this teaching, it would have been obvious to one of ordinary skill in the art to employ activated carbon in the catalyst bed of the modified primary for the known and expected result of improving the ozone reaction of the gas stream as suggested by the reference of Sudduth et al.

11. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smalheiser (US 3,933,980) in view of Bentz (US 5,064,763) and Hofmann (DE 4335717).

The combination of the reference of Smalheiser and Bentz has been discussed above.

Claim 14 differs by reciting that the biological contacting system is a trickle system.

The reference of Hofmann discloses that the use of a trickle system is known in the art for contacting a gas stream with a biological medium for treating the gas stream (See the English language abstract and Figures).

In view of this teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ a trickle system rather than a bed system of the reference of Bentz for the known and expected result of providing an alternative means recognized in the art to achieve the same result, contacting the gas stream with a biological medium to degrade components of the gas stream.

With respect to claim 15, the reference of Hofmann et al. also discloses that it is known in the art to combine a biological treatment system and ozone treatment system within the same device (See the English language abstract and Figures).

In view of this teaching, it would have been obvious to one of ordinary skill in the art to provide both the ozone contacting device and biological contacting device within the same

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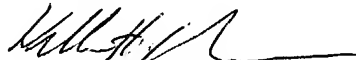
treatment structure as a means for conserving space by only requiring the need of a single structure to perform both gas-treatment steps.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to William H. Beisner whose telephone number is 571-272-1269. The examiner can normally be reached on Tues. to Fri. and alt. Mon. from 6:15am to 3:45pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert J. Warden can be reached on 571-272-1281. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1700.


William H. Beisner
Primary Examiner
Art Unit 1744

WHB